UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

December 14, 2012

Ms. Abigail Low
GSA Project Manager
20 N 8th Street
Philadelphia, PA 19107

Re: U.S. Department of State Bureau of Diplomatic Security, Foreign Affairs Security Training Center, Nottoway County, VA (CEQ No. 20120342)

Dear Ms. Low:

In accordance with the National Environmental Policy Act (NEPA) of 1969, Section 309 of the Clean Air Act and the Council on Environmental Quality regulations implementing NEPA (40 CFR 1500-1508), the U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement (DEIS) for the U.S. Department of State Foreign Affairs Security Training Center in Nottoway County, Virginia.

The DEIS addresses the proposed development and operation of the Department of State (DOS) Foreign Affairs Security Training Center (FASTC) in Nottoway County Virginia, on land within and adjacent to the Army National Guard Maneuver Training Center Fort Pickett (Fort Pickett). The purpose and need for the proposed FASTC in Nottoway County is to consolidate existing dispersed training functions into a single suitable location to improve training efficiency and enhance training operations. The FASTC would include facilities for soft skills training, such as classrooms, simulation labs, and a fitness center; hard skills training, such as driving tracks, mock urban environments, and firing and explosives ranges; as well as administrative and life support facilities including administrative offices, dormitories, a dining hall, and emergency medical response services. It is anticipated that the facility will require approximately 1500 acres of property.

The DEIS summarizes the process followed in screening, study and selection of the proposed location at Fort Pickett. Fort Pickett encompasses approximately 45,000 acres, most of which were identified as no longer required by the U.S. Army by the 1995 Defense Base Closure and Realignment Commission. One hundred forty acres were identified as a U.S. Army Reserve enclave. The Virginia Army National Guard (VAARNG) has operational control over approximately 42,000 acres of Fort Pickett through a 1997 facility land use agreement and it is currently being used as a Maneuver Training Center. Approximately 2,950 acres were not needed for military uses and were deeded to Nottoway County in 2000 for use in the economic

development activities of the Local Redevelopment Authority (LRA). FASTC operations appear to have compatible and appropriate requirements for the excised property.

The DEIS evaluates two build alternatives, Alternative 1 and Alternative 2 (the Preferred Alternative), and the No Action Alternative. Under Build Alternative 1, training would occur at the site in hard and soft skills training facilities and life support facilities located on Parcel 21/20 off Dearing Road and LRA Parcel 9 off Military Road. Under Build Alternative 2, the facilities would be located on Parcel 21/20, LRA Parcel 9, and two additional parcels—the Grid Parcel and LRA Parcel 10. The major differences between Build Alternative 1 and Build Alternative 2 are the locations of the Main Campus, Mock Urban Environments, and three buildings of the High Speed Driving Track Area. Under Build Alternative 2, the Main Campus would be located on LRA Parcel 10 (instead of Parcel 21/20 in Alternative 1); the Mock Urban Environments would be located on LRA Parcel 9 and the Grid Parcel (instead of only LRA Parcel 9, for Alternative 1).

The proposed re-use of the Fort Pickett site for FASTC involves notable environmental impacts to the property for either Build Alternative 1 or 2. Impacts include 7.01 acres of wetlands (5.20 direct fill/1.81 indirect clearing) for Alternative 1 in addition to 27.56 acres of wetland buffer clearing; or for Alternative 2, 6.5 acres of wetlands (4.20 direct fill/2.30 indirect clearing) and approximately 22.01 acres of wetland buffer clearing. Alternative 1 would impact 1,205 linear feet of stream and Alternative 2 would impact 1,127 linear feet of stream. The net increase of impervious surface for Alternative 1 would be 214 acres and 225 acres of net increase for Alternative 2. Vegetation clearing for Alternative 1 would be 500 acres (460 forest; 40 shrub/grass) and Alternative 2 would impact 525 acres of vegetation (480 forest; 45 shrub/grass). GSA has identified Alternative 2 as the Preferred Alternative, which appears also to be the alternative which minimizes some critical environmental impacts.

EPA understands the purpose and need for the proposed action for the DOS FASTC. EPA appreciates the effort made by GSA to involve Federal agencies in the NEPA process, including allowing EPA to be a Cooperating Agency in development of this EIS. However, as a result of our review of the DEIS, EPA has some questions and concerns regarding impacts to vegetation, wetlands, threatened and endangered species, and noise. It is understood that establishment of a facility of this size is likely to result in some environmental damages. It is hoped that during more detailed planning, additional avoidance and minimization measures will be sought and implemented as allowed. EPA commends the effort made to find a suitable location for the FASTC. A detailed description of our questions/concerns is presented in the Technical Comments (enclosed) for your consideration. EPA rated the DEIS an EC-2 (Environmental Concerns/Insufficient Information), which indicates that we have environmental concerns regarding the proposal and that the study does not contain sufficient information to fully assess the environmental impacts that should be avoided by this project. A copy of the EPA's rating system is enclosed for your information.

Thank you for providing EPA with the opportunity to review this project. If you have questions regarding these comments, the staff contact for this project is Karen DelGrosso; she can be reached at 215-814-2765.

Sincerely,

Barbara Rudnick
NEPA Team Leader
Office of Environmental Programs

Enclosure (2)

Technical Comments

Groundwater/Surface Water

Page 3-19 references EBS-13 (within the LRA Parcel 9) as having an ongoing remedial action and monitoring program associated with the Former Recycling Compound, specifically the Paint Pit. "Land Use Controls [LUCs] are in place to protect against groundwater usage/contact until contaminant concentrations are brought into compliance with regulatory levels." The DEIS states, "In addition, a groundwater monitoring program is ongoing for the Trimble Road Landfill (adjacent to Parcel 21/20). Additional information on EBS-13 and landfill is provided in Section 3.15." There is no Section 3.15 in the DEIS; it is assumed, however, that the reference should be to Section 3.2.11.2.

The areas discussed should be identified on a map (Figures 2.2-1 and 2.2-2). EPA appreciates that as stated on page 3-125, "The LUCs prohibit the disturbance of soils in a 4 acre portion of the site thereby blocking human exposure to contaminated groundwater. The LUCs also prevent exposure to materials potentially presenting an explosive hazard (MPPEH), which are also suspected to be in the area. Plans for development would need to be made consistent with these limitations." It is encouraged that the FASTC project be discussed with the remedial team to ensure that the proposed actions will not impede on remedial efforts or pose threats for contamination.

Page 3-20 states in reference to Parcel 21/20, "According to the 2012 Virginia 305(b) list the waters of Birchin Creek are classified as 3A. A 3A classification indicates that no data are available within the data window of the current assessment to determine if any designated use is attained and the water was not previously listed as impaired and is therefore considered to be unimpaired." Please clarify: will Birchin Creek be assessed for baseline data so that information will be recorded for future assessment and/or monitoring of impact from FASTC activities?

In reference to LRA Parcel 10, "None of the surface waters present on the LRA Parcel 10 are classified as impaired by DEQ. These waters are either unimpaired or have not been assessed." Will the surface waters on LRA Parcel 10 be assessed prior to project implementation?

Threatened and Endangered Species

Page 4-15 states, "The USFWS has concurred with GSA's "no affect" determination with regards to Michaux's Sumac, Roanoke logperch, dwarf wedgemussel and bald eagle (Appendix C). Virginia agencies, Virginia Department of Game and Inland Fisheries and Department of Conservation and Recreation were provided GSA's assessment of effects with regard to state threatened and endangered species (Appendix C), but did not pursue an informal review." Appendix C provides a copy of the letter from the Department of Game and Inland Fisheries dated July 30, 2012 stating that they are unable to provide a review due to staffing limitations. EPA appreciates that Virginia agencies were given an opportunity to comment on the DEIS.

Because State consultation is important, it is worth pursuing input even if it means waiting for their review. In addition, it is important to include the most recent state and federal threatened and endangered species coordination letters within the FEIS. It is also recommended that the appropriate state and federal agencies be contacted annually regarding species of concern.

Noise

Page 3-59 states, "Under enhanced propagation conditions ((Figure 3.2-2), the High Complaint Risk area (130 to 140 dB PK15 [met]) extends beyond the Fort Pickett boundary less than 2,950 feet (0.6 miles) at Ranges 15 and 16 and from the artillery firing points near the boundary. The Moderate Complaint Risk area (115 to 130 dB PK15 [met]) extends beyond the boundary in most directions up to 7,220 feet (1.4 miles)." In addition, "Under neutral propagation conditions (Figure 3.2-3), the High Complaint Risk area (130 to 140 dB PK50 [met]) remains within Fort Pickett except for small areas near Ranges 15 and 16 from the artillery firing points near the boundary. The Moderate Complaint Risk area (115 to 130 dB PK50 [met]) extends beyond the boundary less than 4,250 feet (0.8 miles). Ranges 15 and 16 should be clearly depicted on a map. It is important to note that this information is baseline although Figures 4.2-5 through 4.2-10 show baseline + build alternative noise contours. It would be helpful to have an overlay map showing baseline and build alternatives noise impacts to have a clearer image of impacts. Are there any mitigation measures that can be implemented in and around these areas to reduce noise impact?

Page 3-49 states, "Though the complaint risk guidelines would indicate a moderate to high risk of complaints, these areas are sparsely developed, and as such, the risk of complaints from off-post residences is low under the baseline scenario. Although these baseline contours do extend outside Fort Pickett in certain areas they do not extend beyond the ACUB."

Page 4-35 states, "Complaint risk from residents in the surrounding community would still be expected to be low because of the existing acclimation to baseline noise from Fort Pickett munitions and aircraft operations, sparse residential development in that area, and the infrequency of peak events." Because this rationale is based on assumption, it would seem prudent to incorporate a periodic noise assessment to factor in a tolerance threshold. Although complaints are expected to be low, it is not known when the tolerance threshold would be surpassed. Please describe and document communication made to affected residences.

The FEIS should quantify the number of residences, etc. that may be impacted in addition to identifying any sensitive resources (including schools, churches, etc.). Outreach to these affected areas should be made and appropriate mitigation, monitoring and adaptive management should be considered.

Hazardous Areas

Page 3-119 states that there are three locations on Parcel 21/20 western boundary that show evidence of petroleum contamination based on laboratory analysis of soil samples. As the DEIS states, it is possible that residual gasoline contamination is present at some location along the pipeline on Parcel 21/20 and that a Phase II ESA recommends further investigation which GSA intends to conduct to determine if contamination is present. The area of potential impact should be depicted on a map in relation to proposed actions. Results of the Phase II ESA should be used in the planning of the proposed action. This is also recommended for the Grid Parcel in which investigations of the pipeline are to be conducted.

Page 3-121 states that groundwater samples indicated contamination (elevated levels of bis(2-ethylhexyl)phthalate) at Building 767 (site identification PA-39). Where is this area on the Grid Parcel? What DOS action is proposed in or near this area?

Page 3-122 states, "The Grid Parcel does not currently contain any structures." "Since it is likely that these structures contained LBP/ACM [Lead Based Paint/Asbestos-Containing Materials] and no documentation of their removal or disposal was available for review, site soils may contain these substances and present a Business Environmental Risk." Will soils in the Grid Parcel be tested for LBP/ACM contamination before implementation of the proposed action?

Page 3-122 states that there could be a potential for radon levels on the Grid Parcel which may be above the USEPA Action Level. What follow-up action is proposed for testing and monitoring of radon within buildings?

Page 3-124 states, "Three unlabeled 50-gallon drums were noted on the property at 507 Garnett Ave and were believed to contain soils associated with the environmental investigation conducted at site EBS-115. It is unknown if the contents of the drums would be classified as hazardous waste." Was the area where the drums were located (on LRA Parcel 9) assessed for potential contamination? Does there appear to be a need to sample the soils?

Page 3-125 discusses the Former Fuel Station Site BCT-22. The DEIS states, "The continued presence of MTBE in MW-14 confirms that the BCT-22 plume has entered LRA Parcel 9. Without current downgradient sampling data, the extent of the plume is not known. However, since no groundwater wells or buildings are proposed in the areas downgradient of the plume, associated health risks are considered to be low." Are there land use controls in place? Will sampling be conducted? What steps are in place to ensure that the area is avoided to safeguard exposure?

Page 3-126 states, "Building 1284 is currently located on LRA Parcel 9 (838 Garnett Ave) and no lead abatement information was obtained for this building." Does GSA plan to survey Building 1284 for LPB?

Page 3-126 states, "Due to the history of LBP removal using sandblasting with no collection measures, LBP may be present in the soil under the tanks (Woodward-Clyde 1997)." Does GSA intend to survey the soils for LBP? Where are the three elevated water storage towers located on LRA Parcel 9 in relation to proposed project areas?

Page 3-126 states, "Installation personnel indicated that removal of the debris subsequent to demolition may have been incomplete, and ACM may still be present in the soils in these areas. Asbestos is also known to be present on water main piping throughout the parcel (GSA 2010)." Does GSA plan to test soils for ACM?

Page 3-127 states, "Because Nottoway County is classified by the USEPA as having a predicted average indoor radon screening level greater than 4 pCi/L, there is also potential for radon levels on Parcel 10 above the USEPA Action Level." As a result of the predicted radon screening levels, it would be prudent to test for radon once buildings are constructed. This should be stipulated and implemented upon building completion so that if needed remedial actions can be incorporated. Please state GSA's intention.

Vegetation

Page 4-12 states, under Build Alternative 1 vegetation clearing would involve approximately 500 acres (460 forest; 40 shrub/grass) from Parcel 21/20 and LRA Parcel 9 for the construction of the FASTC facility. As for the Preferred Alternative, page 4-15 states that under Build Alternative 2, approximately 525 acres of land would be directly impacted by clearing on Parcel 21/20, the Grid Parcel, LRA Parcel 9 and LRA Parcel 10 for the construction of the FASTC facility. "Approximately 480 acres of forest and 45 acres of shrubland/grassland would be cleared from these parcels. Currently, approximately 1,335 acres on these parcels contain forestland and 105 acres contain grassland/shrubland. Therefore, the clearing associated with FASTC construction would eliminate approximately 36% of forestland and 43% of grassland/shrubland on these parcels with the greater impact being realized on LRA Parcel 9 and LRA Parcel 10."

The DEIS states that 33,892 acres of forest and 3,000 acres of grassland/shrubland are within Fort Pickett and 415 acres of forest surrounds and encompasses LRA Parcel 10. The Preferred Alternative would constitute an approximate loss of 1.4% of the forestland and 1.6% of the grassland/shrubland present within the surrounding area. Do these figures take into consideration future/cumulative projects presumed to impact terrestrial biological resources? As noted on page 5-17, "Insufficient details on each project are available to assess the total loss of habitat for all of the cumulative projects." Thus, it is difficult to fully assess impacts to forested areas and its impact on habitat, fragmentation, etc. Despite the percentage of clearing in comparison with the total remaining on Fort Pickett, every effort should be made to minimize impacts to forested areas and grassland/shrubland areas and to ensure that the FASTC in combination with future/cumulative projects does not have a compounded impact on vegetation

resources and habitat. It is important to consider the beneficial value that forests have in relation to carbon uptake for Green House Gas (GHG) emissions and incorporate mitigation in the form of replanting trees to compensate for the quantity of trees lost due to construction and operation of FASTC. Forests have a valuable role in the ecosystem and habitat which should be properly mitigated for and addressed by GSA.

The DEIS should provide a complete description of the terrestrial habitat resources in the study area. The composition and characteristics of each community type should be summarized and the functions and total acreage indicated. In addition, the species should be mapped relative to habitat locations and species density. Typically, an analysis of forest fragmentation associated with each alternative is provided to assess potential impacts on species.

To determine the baseline value of the habitat and the severity of the potential impacts from the proposed project, EPA recommends that a baseline Habitat Evaluation Procedure (HEP) be completed on the study area using the U.S. Fish and Wildlife Service's Habitat Evaluation Procedure. If the impacts of the wildlife and terrestrial habitat are unavoidable, the HEP will help to determine the type of mitigation measures which would be considered appropriate for the potential impacts. EPA appreciates the mitigation proposed as outlined on page 6.2 (avoid disturbance when possible, treat disturbed edges, re-establish appropriate native plant communities, and connect plant communities across larger areas). However, the HEP will help to determine more effective mitigation appropriate for the study area. Because the direct vegetation impact is considerable, it would be advantageous to implement a more robust mitigation plan to compensate for vegetation loss.

Wetlands

Page 4-8 states, "Under Build Alternative 1, direct impacts from the construction of the FASTC facility would result from filling of approximately 0.07 acres (0.17%) of wetlands on Parcel 21/20 and approximately 5.13 acres (10%) of wetlands on LRA Parcel 9. An additional 0.19 acres (0.46%) of wetlands would be indirectly impacted by clearing and conversion of forested wetland classified as palustrine forested (PFO) on Parcel 21/20 and approximately 1.62 acres (3.2%) on LRA Parcel 9." The DEIS also states that, "Build Alternative 1 would clear approximately 2.29 acres of the wetland buffer present on Parcel 21/20 and approximately 25.27 acres of the wetland buffer present on LRA Parcel 9."

Page 4-10 states, "Under Build Alternative 2, the construction of the FASTC facility would have direct fill impacts on wetlands of approximately 0.06 acres (0.15%) of wetlands on Parcel 21/20; 0.062 acres (4%) of wetlands on the Grid Parcel and 4.08 acres (8%) of wetlands on LRA Parcel 9." In addition, "Clearing would indirectly impact an additional 2.25 acres (4.5%) of wetlands on LRA Parcel 9 and 0.05 acres (0.3%) of wetlands on LRA Parcel 10. Wetland clearing would not be required on Parcel 21/20 or the Grid Parcel." The DEIS states, that "Build Alternative 2 would directly impact approximately 0.41 acres of wetland buffer on

Parcel 21/20; 1.26 acres of wetland buffer on the Grid Parcel; 19.2 acres of wetland buffer on LRA Parcel 9; and 1.14 acres of wetland buffer on LRA Parcel 10 from clearing." As the DEIS states, GSA would obtain a permit for wetlands and stream impacts from USACE under CWA Sections 404 and 401, which would require full mitigation of impacts.

EPA appreciates effort to further avoid and minimize impacts to aquatic resources and buffers as more detailed plans are developed. As GSA understands, the resources have important functions in the ecosystem and for water quality. Compensatory mitigation is often not required for buffers which are lost. Consideration of voluntary preservation of buffers, enhancement or establishment of buffers to protect existing or replacement wetlands could be evaluated.

Unavoidable wetlands and stream impacts under Alternative 1 or 2 would be mitigated via one or more of the three proposed mitigation options: (1) purchase mitigation credits from an approved wetlands and stream mitigation bank within the Nottoway River watershed; (2) in lieu fee payment to the Virginia Aquatic Resources Trust Fund managed by the Nature Conservancy; and/or (3) purchase of mitigation credits from the ARNG Maneuver Training Center Fort Pickett located in the Army Compatible Use Buffer area. EPA questions the third mitigation option and requests additional information as to the bank to be used for purchasing mitigation credits. EPA would like to emphasize that the mitigation should be located in the service area to replace lost functions and values in the watershed. If GSA plans to use a bank, please show that the bank has the appropriate number and resource type credits available.

Environmental Justice

Page 3-83 states, "Environmental justice is achieved if minority and low-income communities are not subjected to disproportionately high or adverse environmental effects. The environmental justice analysis addresses the characteristics of race, ethnicity and low income status for populations residing in areas potentially affected by implementation of the Proposed Action." While it is true that a major part of the goal of Environmental Justice is to assure that minority and/or low-incomc populations are not exposed to disproportionately high or adverse environmental impacts, it is also import to recognize that those populations need to be meaningfully involved in decision making, that these populations have access to information, are able to participate in a timely and appropriate manner, and that their comments and concerns are heard and given appropriate consideration during the process. The goal of the Environmental Justice assessment is to accurately identify the populations of potential Environmental Justice concern, and to use that information to determine if there may be any potentially disproportionate or adverse impacts that may impact those populations. The assessment is also conducted to assure that populations of concern are able to participate in an appropriate manner, and that they are able to express their concerns, receive information, and participate in decision making in a way that is meaningful and appropriate.

The percentages of minority and low income populations in the counties in the study area are above the state averages for minority and low income populations in the state of Virginia. There needs to be some mention of this in the FEIS.

It would be helpful to show areas of potential Environmental Justice concern on all maps so that other reviewers and readers may be able to assess the proximity of the areas of potential Environmental Justice concern as related to project activities and potential impacts.

Whenever possible and appropriate, tables should present data comparisons for the state, county and study area.

Are there or will there be any activities taking place in close proximity to minority and/or low income populations in the short or long term that may cumulatively or singularly expose these at risk populations to potentially disproportionate or adverse impacts as related to construction, truck traffic, fugitive dusts, loss of services, noise, vibration, etc.?

GSA references adherence to LEED/LID practices in Table 4.3-1. However, EPA is providing detailed information below for your consideration:

Leadership in Energy and Environmental Design (LEED)

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. Members of the U.S. Green Building Council representing all segments of the building industry developed LEED and continue to contribute to its evolution. LEED standards are currently available for:

- New construction and major renovation projects (LEED-NC)
- Existing building operations (LEELD-EB, Pilot version)
- Commercial interiors projects (LEED-CI, Pilot version)
- Core and shell projects (LEED-CS, Pilot version)

LEED was created in order to define "green building" by establishing a common standard of measurement; promote integrated, whole-building design practices; recognize environmental leadership in the building industry; stimulate green competition; raise consumer awareness of green building benefits; and transform the building market.

LEED provides a complete framework for assessing building performance and meeting sustainability goals. Based on well-founded scientific standards, LEED emphasizes state of the art strategies for sustainable site development, water savings, energy efficiency, materials,

selection and indoor environmental quality. LEED recognizes achievements and promotes expertise in green building through a comprehensive system offering project certification, professional accreditation, training and practical resources. For more information, contact the U.S. Green Building Council at the following web address: http://www.usgbc.org/leed/leedmain.asp.

Low Impact Development (LID)

Federal agencies are required to reduce the impacts on watershed hydrology and aquatic resources. This effort commonly referred to as low impact development (LID), implements environmentally and economically beneficial landscape practices into landscape programs, policies and practices by using a natural approach to land development and stormwater management. Federal agencies are required by Executive Order 13148 to incorporate the principles put forth in a Guidance dated August 10, 1995. This Guidance is intended to promote principles of "sustainable landscape design and management" which recognizes the interconnection of natural resources, human resources, site design, building design, energy management, water supply, waste prevention, and facility maintenance and operation.

It is important to incorporate LID efforts to mitigate the effects of development through traditional stormwater management practices which have proven to not be entirely successful. Traditional collection and conveyance systems, stormwater ponds and other stormwater facilities do not replicate natural systems, which greatly slow water before it reaches streams, wetlands and other waters. Development often times results in the loss of trees and other vegetation, the compaction of soils by heavy equipment, and the creation of vast stretches of connected impervious areas. These combined factors are extremely difficult to compensate for using traditional practices. As a result, the following site design (goals) and planning practices can be used to minimize stormwater impacts.

Goal: Minimize direct stormwater impacts to streams and wetlands to the maximum extent practicable.

Practices:

1. Locate stormwater facilities outside of streams and wetlands;
2. maintain natural drainage routes on site;
3. preserve riparian buffers; and
4. distribute "Integrated Management Practices" (IMP) used in lieu of centralized ponds.

Goal: Preserve the natural cover on as much of the site as possible, especially for areas located on hydrologic soil groups (HSG) A and B.

Practices:

1. Utilize clustered development designs and preserve a significant portion of the site in a natural state;

2. utilize "fingerprint" clearing by limiting the clearing and grading of forests and native vegetation to the minimum area needed for the construction of the lots, the provision of necessary access, and fire protection;
3. avoid impacts to wetlands to vegetated riparian buffers; and
4. preserve A and B Soils in natural cover.

Goal: Minimize the overall impervious cover.
Practices:

1. Utilize the minimum required width for streets and roads;
2. utilize street layouts that reduce the number of homes per unit length;
3. minimize cul-de-sac diameters, use doughnut cul-de-sacs, or use alternative turnarounds;
4. minimize excess parking space construction, utilize pervious pavers in low-use parking areas;
5. utilize structured or shared parking;
6. reduce home setbacks and frontages;
7. where permitted, minimize sidewalk construction by utilizing sidewalks on one side only, utilizing "Skinny" sidewalks, or substituting sidewalks with pervious trails through common greenspace;
8. substitute pervious surfaces for impervious wherever possible;
9. where permitted, avoid the use of curb and gutter and utilize vegetated open swales, preferably "engineered swales" with a permeable soil base; and
10. minimize compaction of the landscape and in areas where soils will be "disked" prior to seeding, and amended with loam or sand to increase absorption capacity.

Goal: Locate infiltration practices on HSG A and B soils wherever possible. Thus, every effort should be made to utilize areas with these soils for IMP that promote infiltration.

Goal: Locate impervious areas on less permeable soils (HSG C and D). Placement of impervious areas on lower permeability soils minimizes the potential loss of infiltration/recharge capacity on the site.

Goal: "Disconnect" impervious areas. "Disconnecting" means having impervious cover drain to pervious cover (i.e. downspouts draining to the yard, not the driveway). This decreases both the runoff volume and Time of Concentration.

Goal: Increase the travel time of water off of the site (Time of Concentration).
Practices:

1. Flatten grades for stormwater conveyance to the minimum sufficient to allow positive drainage;
2. increase the travel time in vegetated swales by using more circuitous flow routes, rougher vegetation in swales, and check dams; and
3. utilize "engineered" swales in lieu of pipes or hardened channels.

Goal: Utilize soil management/enhancement techniques to increase soil absorption.
Practices:

1. Delineate soils on site for the preservation of infiltration capacity; and
2. require compacted soils in areas receiving sheetflow runoff (such as yards, downslope of downspouts).

Goal: Revegetate all cleared and graded areas.

Goal: Use "engineered swales" for conveyance in lieu of curb and gutter wherever possible.

Goal: Utilize level spreading of flow into natural open space.

For additional and more comprehensive LID information, please refer to the following web sites.

LID Manuals:

- http://www.epa.gov/owow/nps/lid_hydr.pdf
- http://www.epa.gov/owow/nps/lid/lidnatl.pdf
- http://www.bmpdatabase.org
- http://www.epa.gov/ednnrmrl/
- Combined Sewer Overflows Guidance for Monitoring and Modeling Document Type, Published: 1/1/99 http://www.epa.gov/npdes/pubs/chap05-sco.pdf